

ML610Q438/439 Reference Board User's Manual

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Preface

This manual describes the ML610Q438/439 Reference Board.

The following manuals are also available. Read them as necessary.

- ML610Q438/ML610Q439 User's Manual
Description on the ML610Q438/ML610Q439
- uEASE User's Manual
Description on the on-chip debug tool uEASE.

1. Overview

1.1 Features

ML610Q438/439ReferenceBoard is a board for evaluating the function of ML610Q438 or ML610Q439. This board can connect the pin of ML610Q438/439 with a user application system, it can perform the check of a system of operation easily.

By using the board with "on-chip debug emulator" (hereinafter referred to "uEASE") not only Software debugging but also writing Flash ROM in the devices are capable.

The hardware specification of this board is shown below.

Embedded microcontroller	<ul style="list-style-type: none">U1: ML610Q438 or ML610Q439 (The part name is labeled on the solder side of the board.)
Embedded parts	<ul style="list-style-type: none">X1, C5, C6: 32.768KHz resonator and capacitors.
	<ul style="list-style-type: none">PWR: Jumper for input power supply switch (3pin pin-header and short pin)
	<ul style="list-style-type: none">MODE: Jumper for RESET_N pin control switch (3pin pin-header and short pin)
	<ul style="list-style-type: none">CNUE: Connector for uEASE (14pin connector)
	<ul style="list-style-type: none">BIAS: Jumper for bias circuit of LCD (3pin pin-header and short pin)
	<ul style="list-style-type: none">C1-C4, C7-C13, C16: Capacitors for power supply and LCD bias generation circuit
Pads for mounting	<ul style="list-style-type: none">CNU1 to CNU4: Pads for peripheral board connectors (34pin x 4, 2.54mm pitch)
	<ul style="list-style-type: none">IN0, CS0, RCT0, RS0, RT0, CVR0, IN1, CS1, RS1, RT1, CVR1 Pads for RC oscillation type ADC parts
	<ul style="list-style-type: none">X2, C14, C15: Pads for mounting high-speed clock oscillation circuit parts
	<ul style="list-style-type: none">R1 to R14: Pads for opening or short (1608 type)
Power supply pads	<ul style="list-style-type: none">DVDD, GND, AVDD, VREF, AGND
AIN0, AIN1 pads	<ul style="list-style-type: none">AIN0, AIN1
Monitor pads	<ul style="list-style-type: none">RCM: RC oscillation monitor
Operating voltage	<ul style="list-style-type: none">+1.1V to +3.6V
Board size	<ul style="list-style-type: none">71.12 x 60.96 mm

This board is made on the assumption that it is used mounting in the user application board.

There is a possibility of short the circuit when using it on electroconductive so that the board may have the pattern on the solder side.

Therefore, please use the board on nonconductivity or put the protection parts on the solder side if necessary.

1.2 PCB outline drawing

2. Function

2. 1 PWR Jumper (a. PWR)

This is a jumper which input power supply.

When supplying from uEASE, PWR jumper is set to the uE side.

The ability to supply power of the uEASE is +3.3V/100mA.

When supplying from CNU4_1pin and CNU4_2pin, PWR jumper is set to the USR side.

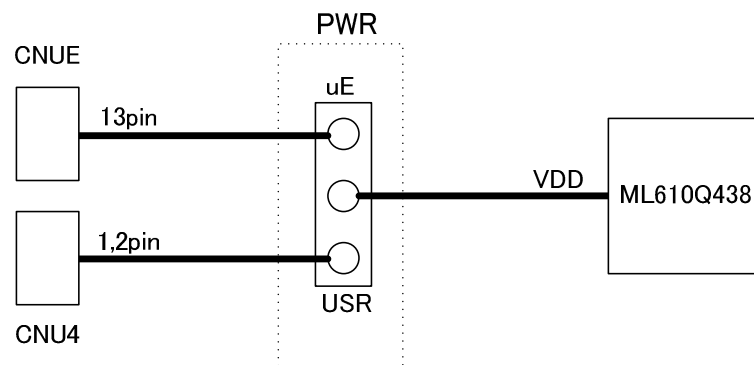


Fig.2 The connection of PWR jumper

【Note】

Notes when the PWR jumper is set to USR side and the uEASE is connected.

Turn on the power supply of the peripheral board after starting the uEASE.

Moreover, Stop the uEASE after turning off the power supply of the peripheral board.

2. 2 MODE Jumper (b. MODE)

This is a jumper which controls the ML610Q438(or ML610Q439) RESET_N pin.

If you use the uEASE, the MODE jumper is set to the uE side.

When it sets to the uE side, a RESET_N pin is controlled from uEASE.

Therefore, it becomes impossible to control a RESET_N pin from CNU3_32pin.

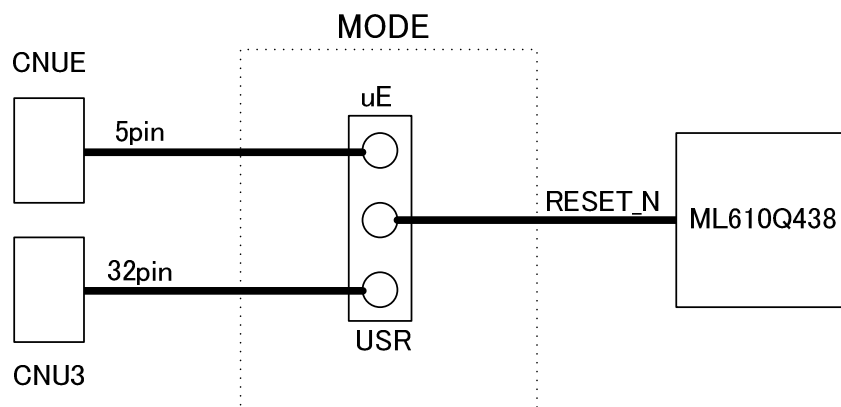


Fig.3 The connection of MODE jumper

2. 3 BIAS Jumper (c. BIAS)

This is jumper which chooses LCD bias.

When you use the 1/3 bias, set BIAS jumper to the 1/3 side.

When you use the 1/4 bias, set BIAS jumper to the 1/4 side.

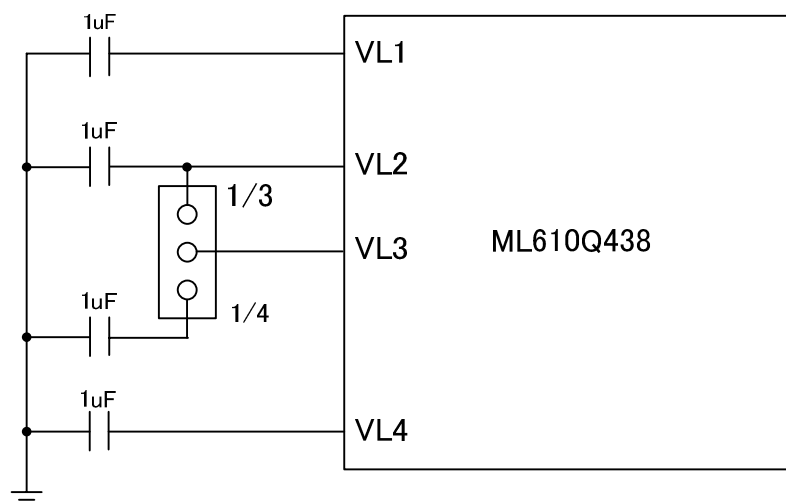


Fig.4 The connection of BIAS jumper

2. 4 When you use RC_ADC0 (d. RC_ADC0)

- (a) Please cut each short pattern of R5, R6, R7, R8 and R9 that is on the back side of this board.
If each short pattern is not cut, the RC-ADC0 converter may not have accurate conversion result under the influence of the noise. Please be sure the cut each short pattern.
- (b) Please mount parts on the each pad of the IN0, CS0, RCT0, RS0, RT0 and CVR0 pads.
Refer to ML610Q438/ML610Q439 User's Manual for the parts to mount.

The example of processing is shown below.

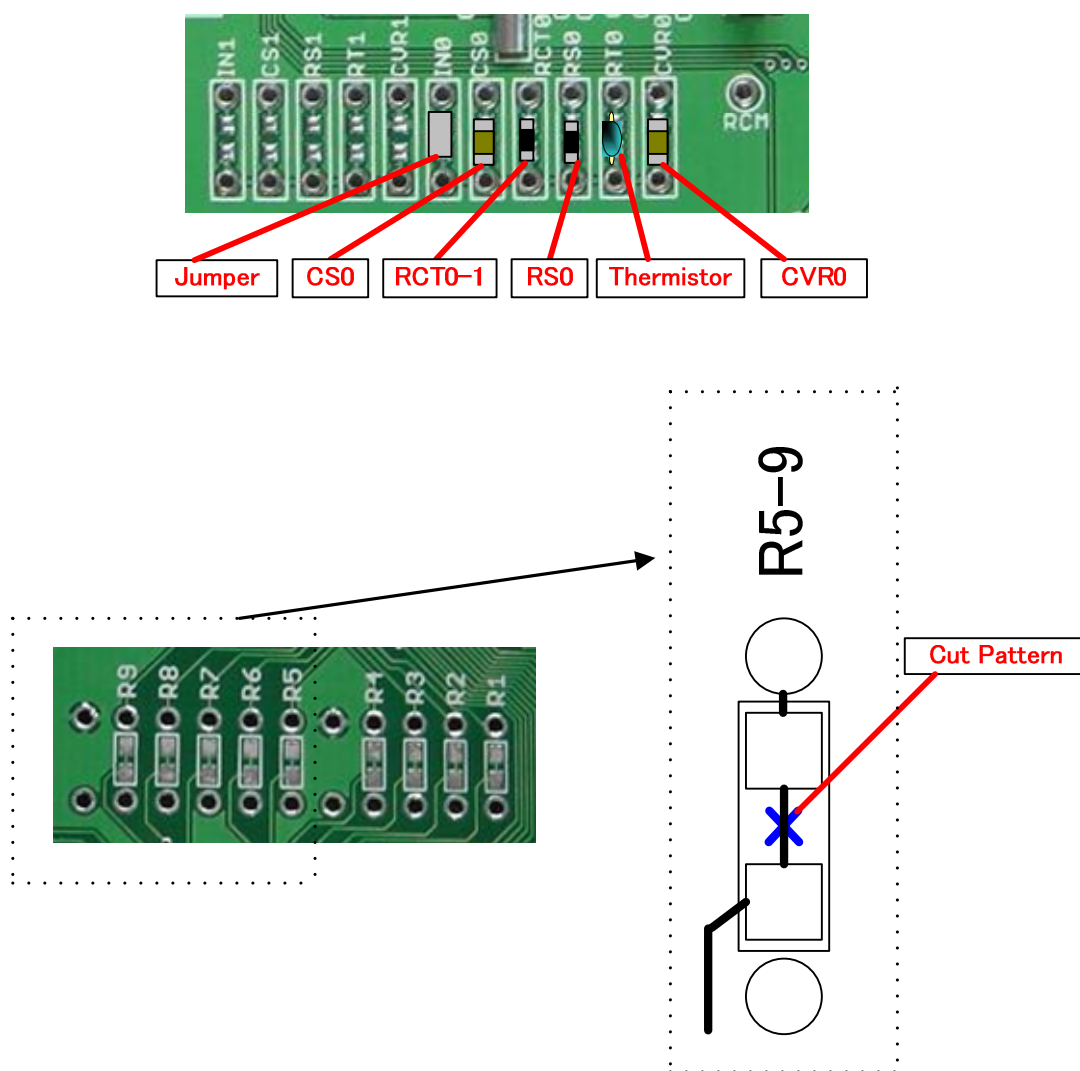


Fig.5 The example of processing of RC_ADC0

2. 5 When you use RC_ADC1 (e. RC_ADC1)

- (a) Please cut each short pattern of R1, R2, R3 and R4 that is on the back side of this board.
If each short pattern is not cut, the RC-ADC1 converter may not have accurate conversion result under the influence of the noise. Please be sure the cut each short pattern.
- (b) Please mount parts on the each pad of the IN1, CS1, RS1, RT1 and CVR1 pads.
Refer to ML610Q438/ML610Q439 User's Manual for the parts to mount.

The example of processing is shown below.

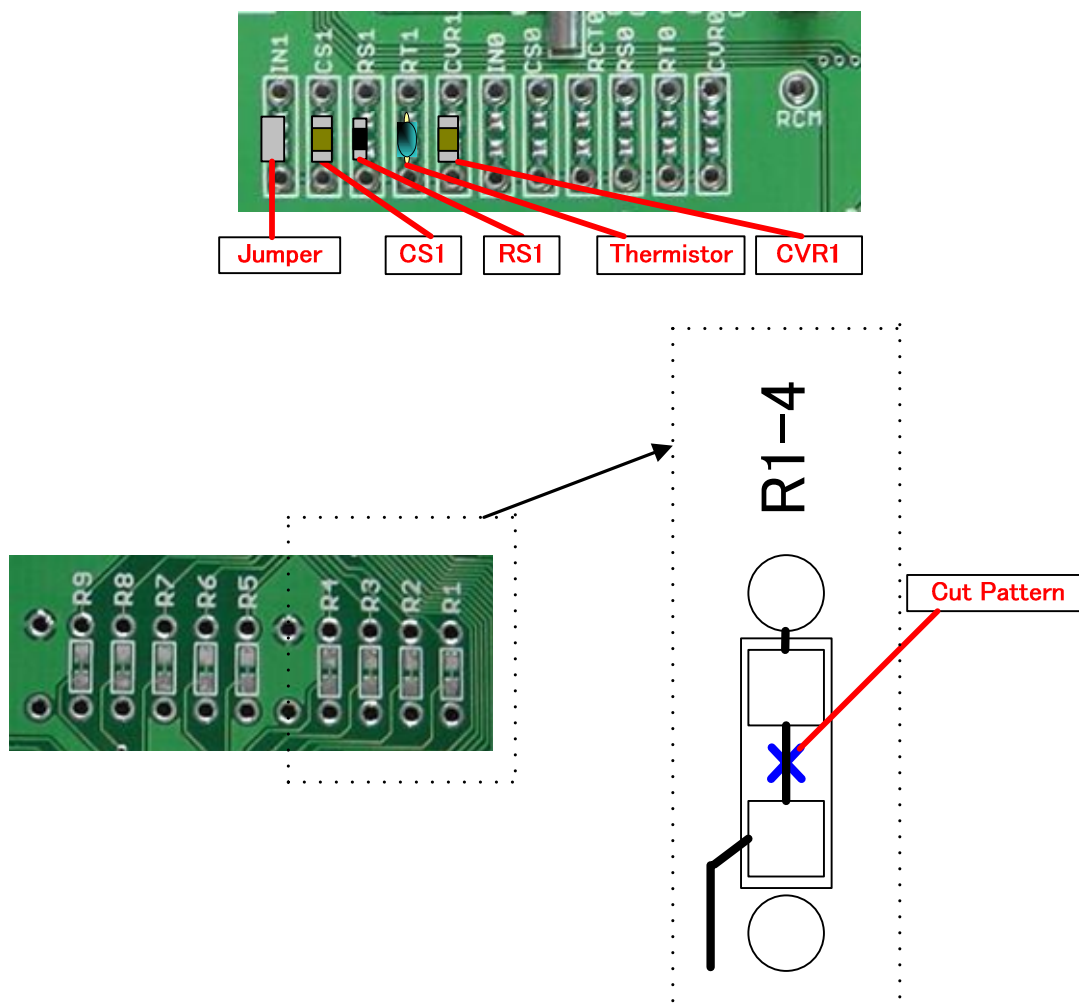


Fig.6 The example of processing of RC_ADC1

2. 6 When you use SA_ADC (f. SA_ADC)

- (a) The AVDD pin and VREF pin of this board are connected to AGND.
Please cut each short pattern of R12 and R13, and it separates from AGND.
- (b) The suitable voltage for AVDD input pad, VREF input pad, AGND input pad, AIN0 input pad and AIN1 input pad is supplied.
Please mount noise decrease capacitor for AIN0 capacitor pad, AIN1 capacitor pad and VREF capacitor pad if you need.

[NOTE]

When you supply voltage to AVDD and VREF, please be sure to cut the short pattern of R12 and R13.

The example of processing of SA_ADC is shown below.

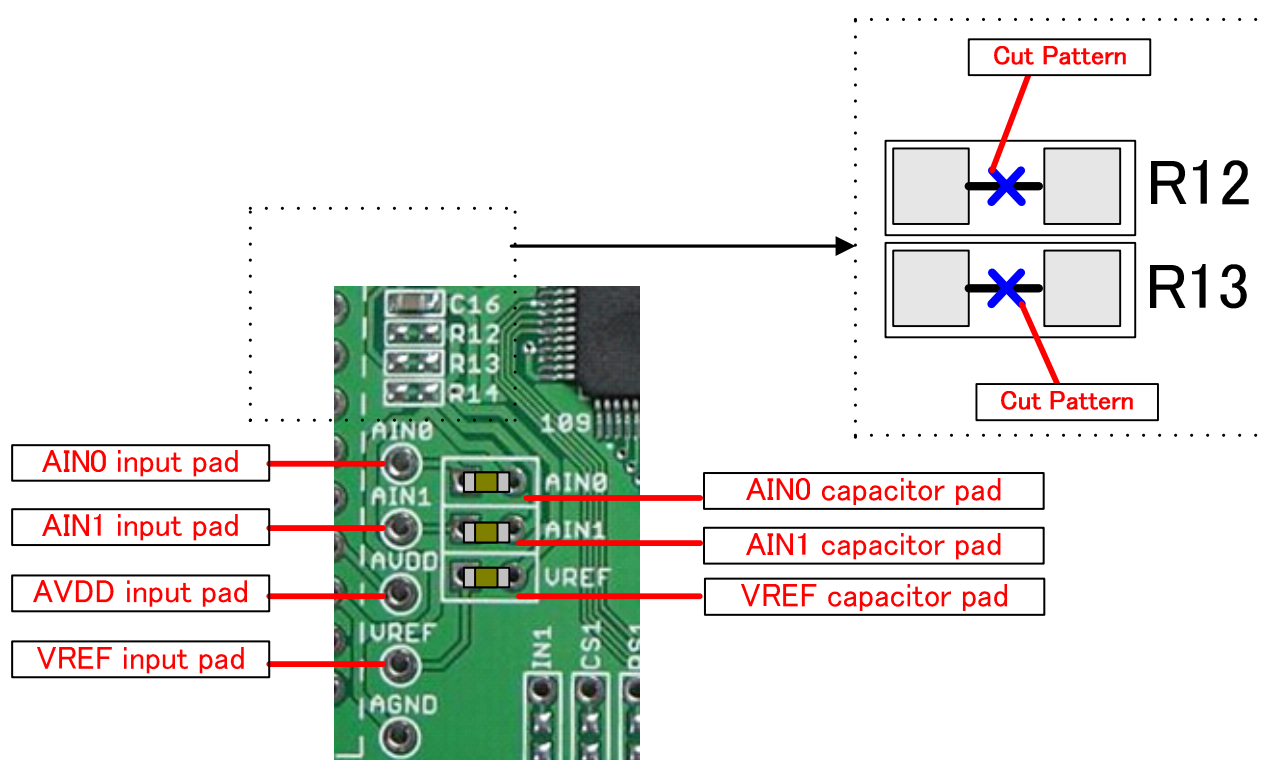


Fig.7 The example of processing of SA_ADC

2. 7 When you use the high-speed clock generation circuit (g. High-speed clock)

Please mount parts on the each pad of the X2, C14 and C15 pads.
Please cut each short pattern of R10 and R11 if you need.

The example of processing of the high-speed clock generation circuit is shown below.

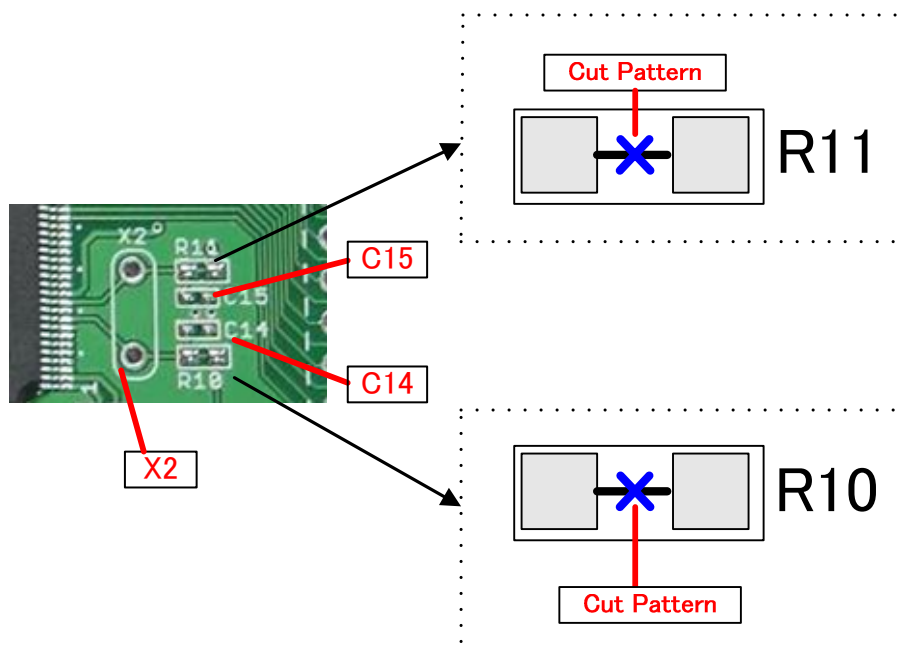


Fig.8 The example of use the high-speed clock generation circuit

3. User Interface

3. 1 The user interface of ML610Q438ReferenceBoard

Table1 shows the user interface of reference board which mounted ML610Q438.

Table 1 CNU1-4 of ML610Q438ReferenceBoard

Pin	CNU1	CNU2	CNU3	CNU4
1	P03/EXI3	PA0	SEG20	VDD
2	P02/EXI2	PA1	SEG21	VDD
3	P01/EXI1	PA2	SEG22	SEG51
4	P00/EXI0	PA3	SEG23	SEG52
5	NMI	PA4	SEG24	SEG53
6	P20	PA5	SEG25	SEG54
7	P21	N.C	SEG26	SEG55
8	P22	N.C	SEG27	COM23
9	P40	COM15	SEG28	COM22
10	P41	COM14	SEG29	COM21
11	N.C	COM13	SEG30	COM20
12	P42	COM12	SEG31	COM19
13	P43	SEG0	SEG32	COM18
14	P44	SEG1	SEG33	COM17
15	P45	SEG2	SEG34	COM16
16	P46	SEG3	SEG35	COM0
17	P47	SEG4	SEG36	COM1
18	P30	SEG5	SEG37	COM2
19	P31	SEG6	SEG38	COM3
20	P32	SEG7	SEG39	COM4
21	P33	SEG8	SEG40	COM5
22	P34	SEG9	SEG41	COM6
23	P35	SEG10	SEG42	COM7
24	P07	SEG11	SEG43	COM8
25	P06	SEG12	SEG44	COM9
26	P05	SEG13	SEG45	COM10
27	N.C	SEG14	SEG46	COM11
28	N.C	SEG15	SEG47	AVDD
29	P04	SEG16	SEG48	VREF
30	N.C	SEG17	SEG49	AVSS
31	P10	SEG18	SEG50	AIN0
32	P11	SEG19	RESET_N	AIN1
33	VSS	VSS	VSS	VSS
34	VSS	VSS	VSS	VSS

3. 2 The user interface of ML610Q439ReferenceBoard

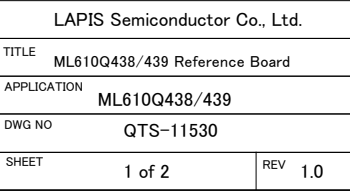
Table2 shows the user interface of reference board which mounted ML610Q438.

Table 2 CNU1-4 of ML610Q439ReferenceBoard

Pin	CNU1	CNU2	CNU3	CNU4
1	P03/EXI3	PA0	SEG20	VDD
2	P02/EXI2	PA1	SEG21	VDD
3	P01/EXI1	PA2	SEG22	SEG51
4	P00/EXI0	PA3	SEG23	SEG52
5	NMI	PA4	SEG24	SEG53
6	P20	PA5	SEG25	SEG54
7	P21	N.C	SEG26	SEG55
8	P22	N.C	SEG27	SEG56
9	P40	COM15	SEG28	SEG57
10	P41	COM14	SEG29	SEG58
11	N.C	COM13	SEG30	SEG59
12	P42	COM12	SEG31	SEG60
13	P43	SEG0	SEG32	SEG61
14	P44	SEG1	SEG33	SEG62
15	P45	SEG2	SEG34	SEG63
16	P46	SEG3	SEG35	COM0
17	P47	SEG4	SEG36	COM1
18	P30	SEG5	SEG37	COM2
19	P31	SEG6	SEG38	COM3
20	P32	SEG7	SEG39	COM4
21	P33	SEG8	SEG40	COM5
22	P34	SEG9	SEG41	COM6
23	P35	SEG10	SEG42	COM7
24	P07	SEG11	SEG43	COM8
25	P06	SEG12	SEG44	COM9
26	P05	SEG13	SEG45	COM10
27	N.C	SEG14	SEG46	COM11
28	N.C	SEG15	SEG47	AVDD
29	P04	SEG16	SEG48	VREF
30	N.C	SEG17	SEG49	AVSS
31	P10	SEG18	SEG50	AIN0
32	P11	SEG19	RESET_N	AIN1
33	VSS	VSS	VSS	VSS
34	VSS	VSS	VSS	VSS

4 . Schematics and PCB dimensional drawing

The this board schematics and the demensional drawing are shown as follows.

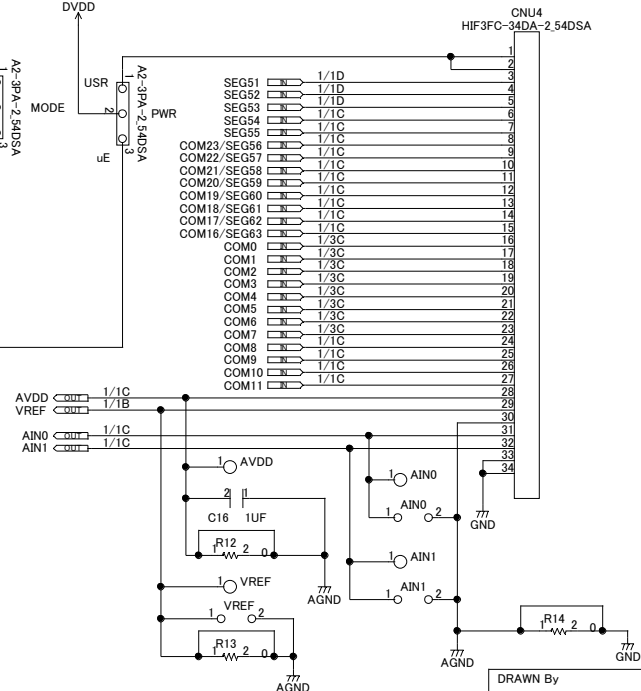
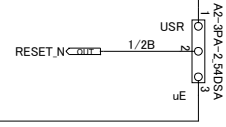
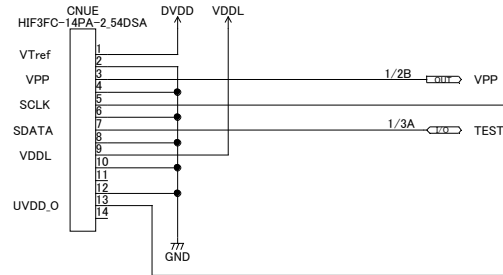
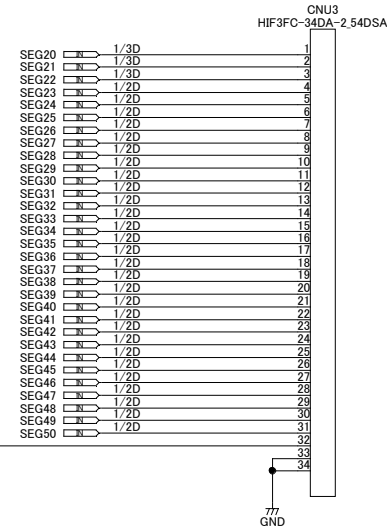
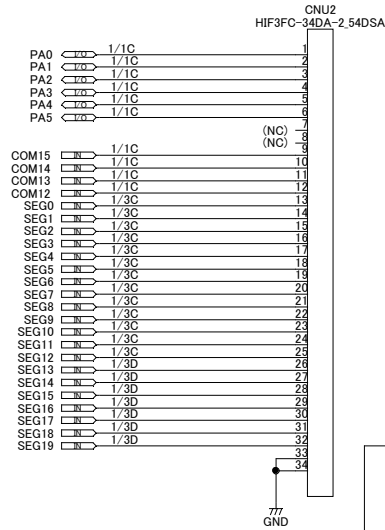
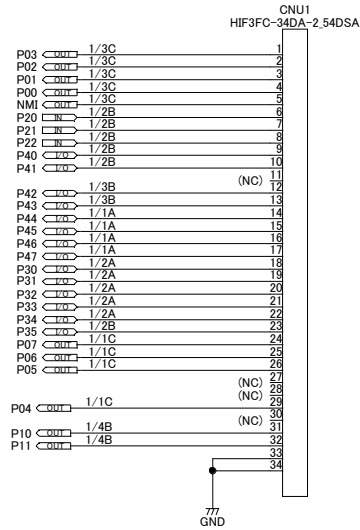


A

B

C

D



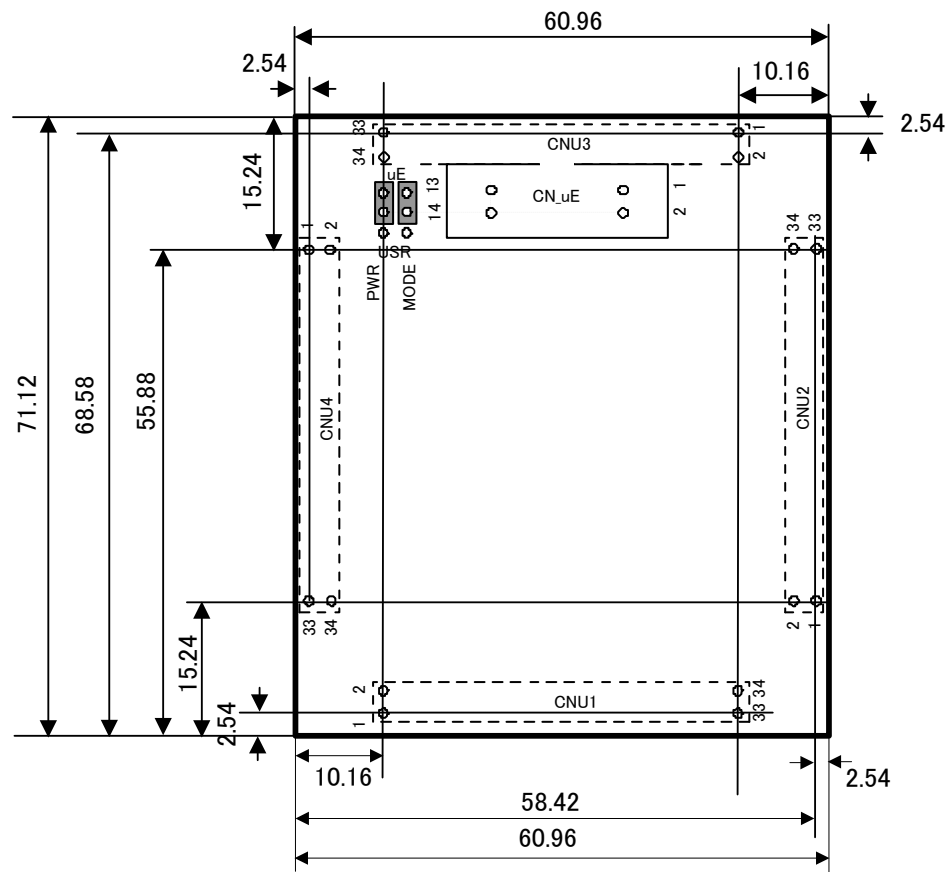
LAPIS Semiconductor Co., Ltd.	
TITLE	ML610Q438/439 Reference Board
APPLICATION	ML610Q438/439
DWG NO	QTS-11530
SHEET	2 of 2
REV	1.0

A

B

C

D



ML610Q4xx Reference Board TOP_VIEW

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**ML610Q4xx Reference Board
Dimensional drawing**